<u>AMENDMENTS TO THE SPECIFICATION</u>

<u>In the Specification</u>:

Please replace the paragraph beginning at pg. 12, ln. 21 with the following amended paragraph:

For example, electrochemical sensor electrodes can be provided with either a triangular wave or sinusoidal waveform of a particular voltage value and frequency. The voltage value and frequency applied to the electrochemical sensor will indicate the presence of particular compounds, additives, and contaminants such as water. Spanning particular voltage ranges and frequencies will cause certain compounds to oxidize and reduce thereby providing an indication in the IV (current-voltage) curve of the presence of these different chemicals. The selection of voltage and frequency ranges can be dynamically adjusted to focus in on compounds of interest or to provide a more complete FTIR spectrum to be synthesized. For example, existence of a particular compound of ~~interested~~ <u>interest</u> can be indicated on a general wide voltage sweep IV curve. Based on the interpreted IV curve, the cyclic voltammetry process can then be repeated [[with]] within a very limited voltage range and at a slower frequency to highlight specific contaminants detected. This more precise information can be used to dynamically increase the accuracy and resolution of the synthesized FTIR spectrum as needed.

Please replace the paragraph beginning at pg. 14, ln. 9 with the following amended paragraph:

Turning now to Fig. 2, a system 200 that automatically maintains fluid within machinery based at least in part on a lubricity measurement and/or FTIR spectrum plot is illustrated. The system 200 includes a sensor 202 that comprises a plurality [[if]] <u>of</u> sensor elements 204 that facilitate measuring particular parameters of a fluid 206. For example, the sensor elements 204 can obtain measurements regarding pH, viscosity, temperature, TAN, conductivity, water content, and various other physical and chemical parameters relating to the fluid 206. Furthermore, the sensor elements 204 can include devices fabricated to particularly obtain data relating to lubricity of the fluid 206 in particular situations. For instance, two surfaces can be positioned to incidentally move relative to one another within the fluid 206, thereby causing friction between the surfaces (*e.g.,* the fluid 206 is provided to reduce friction between the surfaces). An amount of energy provided to the surfaces and distances that the surfaces traveled with respect to one another can be measured and is indicative of lubricity of the fluid 206. A sensor filter/fusion component 208 can receive parameters sensed by the sensor elements 204, and can manipulate such parameters to determine a lubricity measurement 210. The sensor filter/fusion component 208 can, for example, comprise various algorithms that include a first-order chemical model and pattern-recognition algorithms to correlate sensor readings from the sensor elements 204 with laboratory lubricity measurements. Furthermore, as FTIR spectrum information is embedded in readings obtained by the sensor elements 204, the sensor filter/fusion component 208 can facilitate generation of a FTIR spectrum plot 212. The spectrum plot 212 can thereafter be analyzed *via* conventional methods. For example, the FTIR spectrum may indicate a strong presence of water and oxidative compounds.

Please replace the paragraph beginning at pg. 23, ln. 1 with the following amended paragraph:

Fig. 7 illustrates another exemplary multi-element sensor 700 that can be utilized in connection with obtaining a measurement of lubricity and/or an FTIR spectrum plot relating to a fluid. The multi-element sensor 700 includes a pH / TAN sensor 702, an electrochemical sensor 704, a conductivity sensor 706, a temperature sensor 708, and a viscosity sensor 710. The pH sensor 702, the electrochemical sensor 704, the conductivity sensor 706, and the temperature sensor 708 are essentially the same as that described in connection with ~~Fig.6~~ Fig. 6 and therefore further discussion related thereto is omitted for sake of brevity. The viscosity sensor 710 provides for sensing the viscosity of a fluid being analyzed. In short, the viscosity sensor 710 works in conjunction with the temperature sensor 708 to facilitate analyzing viscosity of the fluid being analyzed.

Please replace the paragraph beginning at pg. 25, ln. 13 with the following amended paragraph:

Now referring to Fig. 10, an exemplary sensor element 1000 that can be employed in connection with the present invention is illustrated. The sensing element 1000 includes a piezoelectric actuator beam 1002 that is connected to a contact surface 1004. The contact surface 1004 can be moveable in a y-direction with a force F1 *via* connecting the actuator beam 1004 to a voltage source 1006. A wear surface 1008 ~~driven~~ can also be moveable in the y-direction *via* a force F2 provided by an actuator 1110. The contact surface 1004 can be moved at different distances from the wear surface 908. The contact surface 1004 can further be moved in the vertically-direction in close proximity to the wear surface 1008. The actuator 1010 for the wear surface 1008 exerts the force [[F2on]] <u>F2 on</u> the wear surface 1008. As the contact surface 1004 moves vertically (*e.g.,* in either positively or negatively in the y-direction) near the wear surface 1008 it will exert a moving force through lubricating film to cause the wear surface 1008 to also move vertically. A sensor and controller (not shown) connected to the actuator 1010 can be readily developed to prevent the wear surface 1008 from moving. An amount of force required to keep the wear surface 1008 stationary is substantially similar to a fluid-transmitted force between the two surfaces 1004 and 1008. The control energy required provides an indication of the lubricity of the fluid. Such measurements can be relayed to a data filtering/fusion network (along with various other measurements relating to lubricity of a fluid) to obtain a robust measurement of lubricity of the fluid.

Please replace the paragraph beginning at pg. 27, ln. 16 with the following amended paragraph:

Now turning to Fig. 13, an exemplary sensing element 1300 employed to obtain data relevant to lubricity of a fluid is illustrated. The element 1300 includes a piezoelectric beam 1302 connected to a contact surface 1304. The piezoelectric beam 1302 is operatively coupled to a voltage source/sensor 1305 that delivers voltages to the piezoelectric beam 1302, thereby distorting the beam 1302 and forcing the contact surface 1304 to contact a wear surface 1306. Moreover, application of a voltage to the beam 1302 can cause a force resulting in friction between the contact surface 1304 and the wear surface 1306 (*e.g.,* the contact surface 1304 and the wear surface [[1308]] 1306 move relative to one another in the y-z plane). The wear surface 1306 is coated with an insulating layer 1308, and is operably coupled to an actuator 1310 that facilitates generating friction between the contact surface 1304 and the wear surface 1306. As the wear surface 1306 and the contact surface 1304 move across one another, the insulating layer 1308 will wear. Existence of a conductive path, as well as amount of conductivity, is relevant to lubricity of fluid between the contact surface 1304 and the wear surface 1306. Such data can thereafter be received by a data filtering/fusion network, which can employ the data in connection with determining an amount of lubricity in the fluid.

Please replace the paragraph beginning at pg. 28, ln. 11 with the following amended paragraph:

In an alternative embodiment, rather than an insulating layer the wear surface 1306 can include a relatively thick material 1308 that wears readily. A displacement measure of the wear surface can be utilized to obtain a measurement relevant to lubricity of lubricant. By maintaining a constant force between the contact surface 1304 and the wear surface 1306 while the surfaces 1304 and 1306 are repeatedly moved in close proximity to each other, a measurement can be obtained of displacement of the wear surface 1306 due to wear. <u>The displacement relative to the two surfaces 1304 and 1306 is measured by a displacement measurement component 1312.</u> For example, a capacitive value of the material 1308 can be monitored to determine an amount of wear. Such amount of wear can be utilized in connection with obtaining a measurement of lubricity. While the above exemplary embodiments employ piezoelectric material and various actuators, it is to be understood that any method of creating friction between two surfaces is contemplated and intended to fall within the scope of the hereto-appended claims.

Please replace the paragraph beginning at pg. 29, ln. 4 with the following amended paragraph:

In another operation of this device 1400 (and other similar devices), the surface 1404 can be a wear surface constructed of relatively thick material that readily wears or abrades. The displacement of the wear surface 1404 required to maintain a steady pressure on the rotating disk 1402 is a measure of lubricity. <u>The displacement relative to the two surfaces 1402 and 1404 is measured by a displacement measurement component 1408.</u> Alternatively, a holding force required to keep the surface 1404 stationary and not move tangentially to the rotating disk 1402 is indicative of lubricity. Such measurements can be received by a data filtering/fusion network in connection with generating a measurement of lubricity.

Please replace the paragraph beginning at pg. 30, ln. 19 with the following amended paragraph:

Now regarding Fig. 18, an exemplary sensing element 1800 that can be employed in connection with determining lubricity of a fluid is illustrated. The element 1800 comprises two rotary disks 1802 and 1804 that have axes [[or]] of rotation substantially parallel to one another. The disks are rotated and/or moved in any suitable direction by an actuator 1806. ~~Alternative~~ Alternatively, each disk can be rotated and/or moved by disparate actuators (not shown). In this exemplary embodiment, edges of the rotary disks 1802 and 1804 are moved relative to one another. Forces required to rotate a particular disk a particular distance, forces required to inhibit movement of one or more disks, and/or forces necessary to separate the disks 1802 and 1804 can be indicative of lubricity of a fluid.

Please replace the paragraph beginning at pg. 33, ln. 12 with the following amended paragraph:

In order to provide context for the present invention, ~~Fig 25~~ Fig. 25 illustrates an exemplary environment in which the present invention may be employed. A three-phase AC induction motor 2500 is depicted driving a load 2502 through a shaft coupling 2504. The motor 2500 includes a junction box 2506 for receiving conductors from power lines *via* a conduit 2508, which are tied to power supply lines (not shown) of the motor 2500. The motor 2500 is AC powered and operates at an AC power line frequency of 60 Hz. However, it is appreciated that different line frequencies (*e.g.*, 50 Hz) may be employed. Coupled to the motor 2500 is a fluid analyzer 2510 which as will be discussed in greater detail below provides for receiving and processing data relating to the health of fluid employed by the motor 2500.

Please replace the paragraph beginning at pg. 34, ln. 15 with the following amended paragraph:

Referring now [[in]] to Fig. 26, a schematic representation of the present invention is shown according to one particular aspect of the present invention, wherein a fluid analyzer 2600 is integrated with the lubrication sensor 2602. However, it will be appreciated from the discussion herein that the lubrication analyzer 2600 may be located remotely from the motor 2500 (Fig. 25). Furthermore, it is to be appreciated that the host computer may serve to carry out substantially all of the functions described herein performed by the lubrication analyzer 2600. It is also to be appreciated that in accordance with another specific aspect of the present invention, the lubrication analyzer 2600 (absent certain components) may be integrated onto a semiconductor chip with the lubrication sensor 2602. In accordance with another specific embodiment, the lubrication analyzer 2600 may be completely integrated within the motor 2500 (*e.g.*, in an intelligent motor), a gearbox, pump, filter, drain, or a bearing, for example.

Please replace the paragraph beginning at pg. 34, ln. 27 with the following amended paragraph:

In the preferred embodiment, the lubrication analyzer 2600 includes a housing that is suitably shielded to protect the lubrication analyzer 2600 from whatever environment (*e.g.*, dust, moisture, heat, vibration, lubrication) the motor 2500 is working in. Additionally, the interior of the lubrication analyzer 2600 may be suitably insulated with thermal insulation between the motor and the lubrication analyzer so as to protect it from heat generated by the motor 2500. The lubrication sensor 2602 can include a pH sensor, an electrochemical sensor, a corrosion sensor, a conductivity sensor, a temperature sensor, a viscosity sensor, ferrous contaminant sensor, and any other suitable sensor that can be employed to measure various parameters of a fluid within a machine. The fluid sensor 2602 is operatively coupled to a processor 2604 of the lubrication analyzer 2600 *via* respective analog to digital (A/D) converters [[136]] <u>2607</u> which convert the analog signals output from the fluid sensor 2602 to digital form for processing by the processor 2604.

Please replace the paragraph beginning at pg. 37, ln. 16 with the following amended paragraph:

The display 2610 is coupled to the processor 2604 *via* a display driver circuit 2616 as is conventional. The display 2610 may be a liquid crystal display (LCD) or the like. In one particular embodiment, the display 2610 is a fine pitch liquid crystal display operated as a standard CGA display. The display 2610 functions to display data or other information relating to the state of the fluid and if desired the state of the motor 2500 and ~~recommend action~~ recommended actions (*e.g.* change lube in 2 weeks). For example, the display 2610 may display a set of discrete fluid or fluid condition indicia such as, for example, temperature, pH, electrochemistry, viscosity, and normal operation indicia which is displayed to the operator and may be transmitted over the network 2520. The display 2610 is capable of displaying both alphanumeric and graphical characters. Alternatively, the display 2610 may comprise one or more light emitting diodes (LEDs) (*e.g.*, a tri-state LED displaying green, yellow or red colors depending on the health state of the fluid). An operator input device [[2615]] 2611 can be provided to allow an operator to communicate with the processor 2604 *via* the display 2610.